Dr B R Ambedkar University Delhi (AUD)

Programme Description

The PhD programme in Mathematics aims to introduce students to different areas of research in mathematics. Students of the PhD programme will be expected to contribute new results to their areas of study via original research undertaken.

A secondary aim of the PhD programme is also to create an environment that will enable research students to learn and immerse themselves into the pedagogical aspects of mathematics.

The PhD programme in Mathematics will train scholars in original research. It will enable the students to be able to think and do the research independently. The PhD scholars will also be encouraged to observe and participate in teaching of Mathematics at the undergraduate level to ensure familiarity with pedagogical aspects of Mathematics.

PhD scholars will also be encouraged to explore research methodology and areas of mathematics that intersect with and borrow from other disciplines, specially those available in AUD.

Programme Structure

Scholars admitted to the **PhD programme** in Mathematics, who are not MPhil degree holders in Mathematics will have to do the same course work prescribed for MPhil students. Even those PhD scholars who have an MPhil in Mathematics may be asked to do some course work if the Research Studies Committee (RSC) of the School of Liberal Studies (SLS) feels that his or her research topic requires course work of a particular kind. The nature of the course work to be carried out by such a scholar shall be determined by the RSC.

Once the coursework is completed a student admitted to the PhD programme will work on the dissertation, which will be the student's original work in the chosen area. A PhD scholar will also be encouraged to do the teaching practicum as prescribed for MPhil scholars.

See programme structure under MPhil in Mathematics
(http://aud.ac.in/academic/programs/mphil_programmes-12/mphil_in_mathematics-605)

Broad research themes

The broad research areas are Algebra, Analysis, Algebraic Number Theory and Mathematical Modelling and Simulation. Within these broad areas, research can be pursued in sub-areas such as Group Theory, Ring Theory, Linear Algebra, Complex Analysis, Summability theory, Approximation theory, Valuation Theory, Artificial Neural Networks and Mathematical Modelling.

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PhD level courses

S. No.	Course Name	Core/Elective	Credits
1.	Group Theory	Core	2
2.	Commutative Algebra	Core	2
3.	Linear Algebra and Matrix Theory	Core	2
4.	Algebraic Number Theory	Core	2
5.	Module Theory	Core	2
6.	Functional Analysis	Core	2
7.	Differential and Integral Equations	Core	2
8.	Geometric Function Theory	Core	2
9.	Generalized Hypergeometric Functions and Fractional Calculus	Core	2
10.	Topology	Core	2
11.	Operator Theory	Core	2
12.	Representation Theory of Finite Groups	Elective	3
13.	Advanced Group Theory	Elective	3
14.	Generalized Inverses and Applications	Elective	3
15.	Valuation Theory	Elective	3
16.	Group Rings	Elective	3
17.	Lie Algebras	Elective	3
18.	Fractional Differential Equations	Elective	3
19.	Mathematical Inequalities	Elective	3
20.	Mathematical Modelling	Elective	3
21.	Numerical Analysis	Elective	3

The list of Core and Elective Courses can be expanded depending on research interests of the Mathematics Faculty. Each year, four courses will be offered from the two categories listed below with the caveat that at least one course each will certainly be offered from each of the two categories listed below.

Category 1: Core courses 1-5, **Category 2**: Core courses 6-11.